

Amendments to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1 (Previously Presented): A full-type rolling bearing formed of an outer ring, an inner ring and rollers that are made of steel, wherein

at least one of said outer ring, inner ring and rollers contains a non-diffusible hydrogen content of at most 0.5 ppm, carbon in an amount of 0.95% to 1.10%, silicon in an amount of 0.15% to 0.35%, manganese in an amount of at most 0.5%, phosphorous in an amount of at most 0.025%, sulfur in an amount of at most 0.025%, chromium in an amount of 1.30% to 1.60%, and molybdenum in an amount of less than 0.08%, with the remainder formed of Fe and unavoidable impurities, has a carbonitrided layer in its surface layer, and the austenite crystal grain size number of the surface layer is greater than 10, wherein

after at least one of said outer ring, inner ring and rollers is carbonitrided at a carbonitriding temperature equal to or higher than the A1 transformation temperature, said at least one of said outer ring, inner ring and rollers is cooled to a temperature lower than the A1 transformation temperature and then heated to a quenching temperature of 790°C - 815°C and thereby quenched.

2 (Canceled)

3 (Previously Presented): The full-type rolling bearing according to claim 1, wherein said quenching temperature is in a temperature range at which carbide and/or nitride and an austenite phase coexist in the carbonitrided surface layer of the steel.

4 (Canceled)

5 (Previously Presented): The full-type rolling bearing according to claim 1, wherein at least one of said outer ring, inner ring and rollers is cold-worked before being carbonitrided.

6 (Original): The full-type rolling bearing according to claim 1, wherein in at least one of said outer ring, inner ring and rollers, a compression residual stress of at least 500 MPa is generated.

7 (Previously Presented): A roller cam follower of an engine comprising:
an outer ring being in rolling contact with a cam shaft of the engine;
a roller shaft located inside said outer ring and fixed to a cam follower body; and
bearing elements placed between said outer ring and said roller shaft, wherein
at least one of said outer ring, roller shaft and bearing elements contains a non-diffusible hydrogen content of at most 0.5 ppm, carbon in an amount of 0.95% to 1.10%, silicon in an amount of 0.15% to 0.35%, manganese in an amount of at most 0.5%, phosphorous in an amount of at most 0.025%, sulfur in an amount of at most 0.025%, chromium in an amount of 1.30% to 1.60%, and molybdenum in an amount of less than 0.08%, with the remainder formed of Fe and unavoidable impurities, has a carbonitrided layer, and austenite crystal grains in at least a surface layer are made fine to have a grain size number greater than 10, wherein

after at least one of said outer ring, roller shaft, and bearing elements is carbonitrided at a carbonitriding temperature equal to or higher than the A1 transformation temperature, said at least one of said outer ring, roller shaft and bearing elements is cooled to a temperature lower than the A1 transformation temperature and then heated to a quenching temperature of 790°C - 815°C and thereby quenched.

8 (Previously Presented): A roller cam follower of an engine comprising:
an outer ring being in rolling contact with a cam shaft of the engine;
a roller shaft located inside said outer ring and fixed to a cam follower body; and
bearing elements placed between said outer ring and said roller shaft, wherein
at least one of said outer ring, roller shaft and bearing elements contains a non-diffusible
hydrogen content of at most 0.5 ppm, carbon in an amount of 0.95% to 1.10%, silicon in an
amount of 0.15% to 0.35%, manganese in an amount of at most 0.5%, phosphorous in an amount
of at most 0.025%, sulfur in an amount of at most 0.025%, chromium in an amount of 1.30% to
1.60%, and molybdenum in an amount of less than 0.08%, with the remainder formed of Fe and
unavoidable impurities, has a carbonitrided layer and has a fracture stress of at least 2650 MPa,
wherein

after at least one of said outer ring, roller shaft, and bearing elements is carbonitrided at a
carbonitriding temperature equal to or higher than the A1 transformation temperature, said at
least one of said outer ring, roller shaft and bearing elements is cooled to a temperature lower
than the A1 transformation temperature and then heated to a quenching temperature of 790° -
815°C and thereby quenched.

9 (Previously Presented): A roller cam follower of an engine comprising:
an outer ring being in rolling contact with a cam shaft of the engine;
a roller shaft located inside said outer ring and fixed to a cam follower body; and
bearing elements placed between said outer ring and said roller shaft, wherein
at least one of said outer ring, roller shaft and bearing elements has a carbonitrided layer
and contains a non-diffusible hydrogen content of at most 0.5 ppm, carbon in an amount of
0.95% to 1.10%, silicon in an amount of 0.15% to 0.35%, manganese in an amount of at most

0.5%, phosphorous in an amount of at most 0.025%, sulfur in an amount of at most 0.025%, chromium in an amount of 1.30% to 1.60%, and molybdenum in an amount of less than 0.08%, with the remainder formed of Fe and unavoidable impurities, wherein

after at least one of said outer ring, roller shaft, and bearing elements is carbonitrided at a carbonitriding temperature equal to or higher than the A1 transformation temperature, said at least one of said outer ring, roller shaft and bearing elements is cooled to a temperature lower than the A1 transformation temperature and then heated to a quenching temperature of 790° - 815°C and thereby quenched.

10 (Original): The roller cam follower of an engine according to claim 7, wherein said cam follower body is mounted on one end of a rocker arm, said rocker arm is pivotably attached to a rotational shaft located between said one end and the other end, one end of an open/close valve of said engine abuts on said other end, said cam follower body on said one end has a bifurcated roller supporting portion, and said roller shaft is fixed to said bifurcated roller supporting portion.

11 (Original): The roller cam follower of an engine according to claim 8, wherein said cam follower body is mounted on one end of a rocker arm, said rocker arm is pivotably attached to a rotational shaft located between said one end and the other end, one end of an open/close valve of said engine abuts on said other end, said cam follower body on said one end has a bifurcated roller supporting portion, and said roller shaft is fixed to said bifurcated roller supporting portion.

12 (Original): The roller cam follower of an engine according to claim 9, wherein said cam follower body is mounted on one end of a rocker arm, said rocker arm is pivotably attached to a rotational shaft located between said one end and the other end, one end

of an open/close valve of said engine abuts on said other end, said cam follower body on said one end has a bifurcated roller supporting portion, and said roller shaft is fixed to said bifurcated roller supporting portion.

13 (Original): The roller cam follower of an engine according to claim 7, wherein said cam follower body is mounted between one end and the other end of a rocker arm, said roller shaft is fixed in a roller hole extending between two sidewalls of the rocker arm, an end of an open/close valve of said engine abuts on said one end of said rocker arm, and a pivot abuts on said other end.

14 (Original): The roller cam follower of an engine according to claim 8, wherein said cam follower body is mounted between one end and the other end of a rocker arm, said roller shaft is fixed in a roller hole extending between two sidewalls of the rocker arm, an end of an open/close valve of said engine abuts on said one end of said rocker arm, and a pivot abuts on said other end.

15 (Original): The roller cam follower of an engine according to claim 9, wherein said cam follower body is mounted between one end and the other end of a rocker arm, said roller shaft is fixed in a roller hole extending between two sidewalls of the rocker arm, an end of an open/close valve of said engine abuts on said one end of said rocker arm, and a pivot abuts on said other end.

16 (Original): The roller cam follower of an engine according to claim 7, wherein a rocker arm is pivotably attached to a rotational shaft located between one end and the other end of said rocker arm, an end of an open/close valve of said engine abuts on said one end, said other end abuts on one end of an interlocking rod transmitting a stress from said cam, said cam follower body is mounted on the other end of said interlocking rod, said one end and said

other end of said interlocking rod being located respectively on said rocker arm and said cam, and said roller shaft is attached to said cam follower body and abuts on said cam.

17 (Original): The roller cam follower of an engine according to claim 8, wherein a rocker arm is pivotably attached to a rotational shaft located between one end and the other end of said rocker arm, an end of an open/close valve of said engine abuts on said one end, said other end abuts on one end of an interlocking rod transmitting a stress from said cam, said cam follower body is mounted on the other end of said interlocking rod, said one end and said other end of said interlocking rod being located respectively on said rocker arm and said cam, and said roller shaft is attached to said cam follower body and abuts on said cam.

18 (Original): The roller cam follower of an engine according to claim 9, wherein a rocker arm is pivotably attached to a rotational shaft located between one end and the other end of said rocker arm, an end of an open/close valve of said engine abuts on said one end, said other end abuts on one end of an interlocking rod transmitting a stress from said cam, said cam follower body is mounted on the other end of said interlocking rod, said one end and said other end of said interlocking rod being located respectively on said rocker arm and said cam, and said roller shaft is attached to said cam follower body and abuts on said cam.

19 (Original): The roller cam follower of an engine according to claim 7, wherein said bearing elements are full type needle bearings.

20 (Original): The roller cam follower of an engine according to claim 8, wherein said bearing elements are full type needle bearings.

21 (Original): The roller cam follower of an engine according to claim 9, wherein said bearing elements are full type needle bearings.

22 (Original): The roller cam follower of an engine according to claim 7, wherein said roller shaft has its end with a hardness lower than that of its central portion.

23 (Original): The roller cam follower of an engine according to claim 8, wherein said roller shaft has its end with a hardness lower than that of its central portion.

24 (Original): The roller cam follower of an engine according to claim 9, wherein said roller shaft has its end with a hardness lower than that of its central portion.

25 (Original): The roller cam follower of an engine according to claim 7, wherein said roller shaft has its end which is caulked.

26 (Original): The roller cam follower of an engine according to claim 8, wherein said roller shaft has its end which is caulked.

27 (Original): The roller cam follower of an engine according to claim 9, wherein said roller shaft has its end which is caulked.

28 (Original): The roller cam follower of an engine according to claim 7, wherein said cam follower is entirely press-formed.

29 (Original): The roller cam follower of an engine according to claim 8, wherein said cam follower is entirely press-formed.

30 (Original): The roller cam follower of an engine according to claim 9, wherein said cam follower is entirely press-formed.

31 (New): The full-type rolling bearing according to claim 1, wherein said austenite crystal grain size number is at least 11.